



Mini Review

Volume 3 Issue 2 - July 2017  
DOI: 10.19080/APBIJ.2017.03.555607

Anatomy Physiol Biochem Int J

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# Sternocleidomastoid Region: The “No Man’s Land” in Neck



Sarada Khadka<sup>1</sup>, Harshita Bhardwaj<sup>2</sup>, Akanksha Jain<sup>3</sup>, Ayush Srivastava<sup>4</sup>, Anurag Srivastava\*<sup>5</sup>

<sup>1</sup>Department of Surgery, BP Koirala institute of health sciences, Dharan, Nepal

<sup>2</sup>Department of anatomy, All India Institute of Medical Sciences, India

<sup>3</sup>Department of Pathology, All India Institute of Medical Sciences, India

<sup>4</sup>Army Dental Corpse

<sup>5</sup>Department of surgery, AIIMS, New Delhi

Submission: July 17, 2017; Published: July 31, 2017

\*Corresponding author: Anurag Srivastava, Professor and Head, Department of Surgery, All India Institute of Medical Sciences, New Delhi-110029, India, Tel: 9868397729; Email: [dr.anuragsrivastava@gmail.com](mailto:dr.anuragsrivastava@gmail.com)

## Abstract

Anatomically, the neck is conventionally divided into two triangles by the sternocleidomastoid muscle. Its anterior border forms the posterior border of anterior triangle while its posterior border forms the anterior border of posterior triangle. The “sternocleidomastoid region” of the neck however, does not fall in any of the two triangles and thus becomes the “No Man’s Land” of the neck. There is a lack of defined surgical anatomy of the sternocleidomastoid region in literature, which harbors a number of vital structures and thus would fall under none of the triangles. To a student of anatomy this creates confusion. To resolve this conflict, in present article we identify this region as a distinct zone THE “Sternocleidomastoid region”.

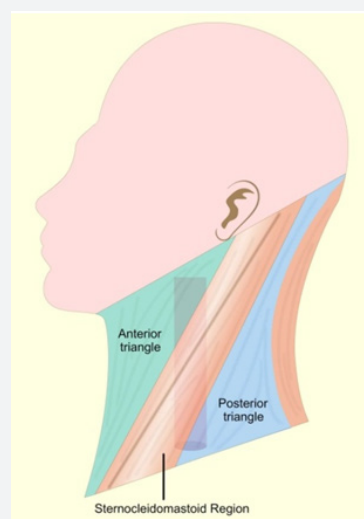
**Keywords:** Anatomy of Neck; Anterior Triangle; Posterior Triangle; Sternocleidomastoid region; Head & Neck Surgery

## Introduction

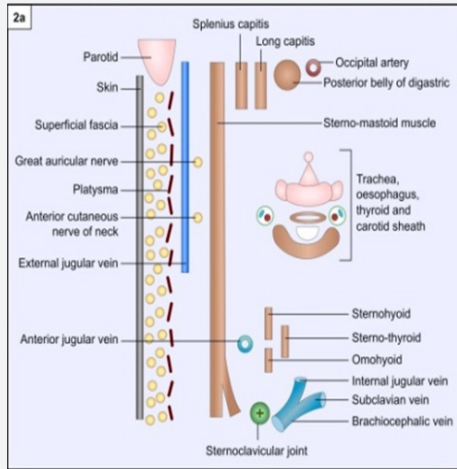
Sternocleidomastoid muscle is an important structure of the neck. This rhomboid shaped muscle lies obliquely in the neck, extending from manubrium sterni, and medial third of the clavicle antero-inferiorly to the mastoid process and occipital bone postero-superiorly. The muscle superficially crosses various vital structures in the neck such as trachea, oesophagus, common carotid artery, internal jugular vein, vagus nerve, sympathetic chain and jugular group of lymph nodes. It is supplied by the occipital and superior thyroid arteries and receives its nerve supply from 11<sup>th</sup> cranial (Spinal root of accessory) and 2<sup>nd</sup> & 3<sup>rd</sup> cervical (Proprioceptive and motor) nerves. Sternocleidomastoid muscle separates the two triangles in each half of the neck [1] (Figure 1). The Anterior Triangle is described as being bounded by mid line anteriorly, anterior border of sternocleidomastoid posteriorly and the lower border of mandible superiorly. The Posterior triangle is described as being bounded by posterior border of sternocleidomastoid, anterior border of trapezius and middle third of clavicle inferiorly.

**Superficial relations of Sternocleidomastoid:** Skin, External jugular vein, Great auricular nerve, Transverse cervical nerve,

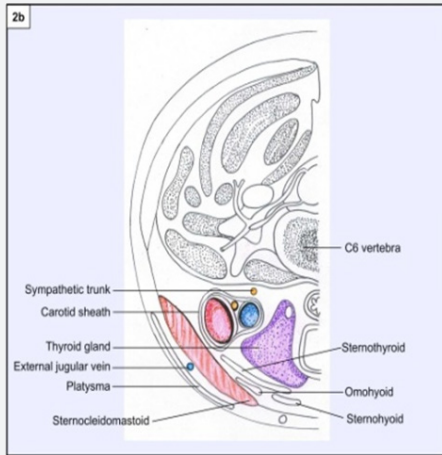
Platysma, Superficial lamina of deep cervical fascia, tail of parotid gland.



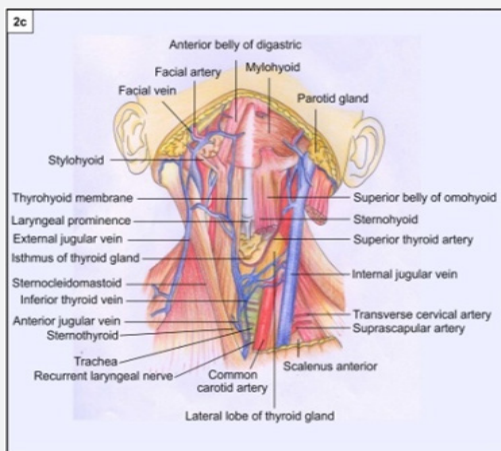
**Figure1:** Lateral aspect of neck showing 2 triangles and rhomboid shaped Sternocleidomastoid region.



**Figure 2a:** Schematic diagram demonstrating superficial and deep relationship of Sternocleidomastoid muscle.



**Figure 2b:** Transverse section of neck at the level of sixth cervical (C6) vertebra showing deep relationship of sternocleidomastoid muscle.



**Figure 2c:** Diagram of front of the neck showing 2 triangles and sternocleidomastoid region.

Deep relations of Sternomastoid muscle (Figure 2a-2c):

**In the upper part**

- a. Muscles: Posterior belly of digastric, longissimus capitis, and splenius capitis.
- b. Artery: Occipital artery.

**In the middle part**

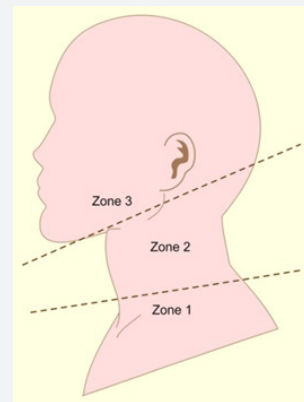
- a. Muscles: Levator scapulae, scalenus anterior, scalenus medius, scalenus posterior, splenius capitis, inferior belly of omohyoid
- b. Arteries: Common carotid, internal carotid.
- c. Veins: Internal jugular, anterior jugular.
- d. Nerves: Vagus, spinal accessory, cervical plexus, brachial plexus (upper part), ansa cervicalis (inferior root).
- e. Glands: Thyroid gland, Parathyroid gland, Lymph nodes.

**In the lower part**

- a. Muscles: Sternohyoid, sternothyroid, scalenus anterior.
- b. Arteries: Subclavian, inferior thyroid, transverse cervical, suprascapular
- c. Veins: Subclavian, Anterior jugular.
- d. Nerves: Brachial plexus (lower part), phrenic nerve.

The point at the junction of the upper and middle third of the posterior border of sternocleidomastoid where four cutaneous nerves and spinal accessory nerve emerge is termed "nerve point of the neck". In 'cervical plexus nerve block' the anesthetic agent is injected at this site [2,3].

Trauma surgeons divide neck region into zone 1, zone 2 and zone 3. Anatomic contents of different zones of neck [4] are shown in Figure 3



**Figure 3:** Zones of the neck.

**I. Zone I:** Sternal notch of clavicle to cricoid cartilage

Contents: Major vasculature of superior mediastinum,

Subclavian artery and vein, common carotid artery, vertebral artery, internal jugular vein, trachea, lung apex, esophagus, thyroid, vagus nerve, recurrent laryngeal nerve, phrenic nerve, cervical spine.

### II. Zone II: Cricoid cartilage to angle of mandible

Contents: common carotid artery, internal and external carotid arteries, vertebral artery, jugular veins, trachea, larynx, pharynx, esophagus, phrenic nerve, vagus nerve, recurrent laryngeal nerve, cervical spine.

### III. Zone III: Angle of mandible to skull base

Contents: Internal and external carotid arteries, vertebral artery, jugular veins, oropharynx, parotid gland, cranial nerves IX-XII.

## Discussion

Sternocleidomastoid is a long muscle which acts as an important landmark in the neck as it divides the neck into anterior and posterior triangles. The Anterior Triangle is described as being bounded by mid line anteriorly, anterior border of sternocleidomastoid posteriorly and the lower border of mandible superiorly. The Posterior triangle is described as bounded by posterior border of sternocleidomastoid, anterior border of trapezius and middle third of clavicle inferiorly. Inferiorly, the muscle has two heads, tendinous sternal head attached to manubrium sterni and muscular clavicular head attached to medial third of the clavicle (clavicular head). Superiorly, muscle is attached to the mastoid process of the temporal bone and superior nuchal line of the occipital bone. The sternal head ascends across the medial part of the sternoclavicular joint, and widens as it overlaps the clavicular head a short distance above the clavicle, fusing with it about half way up the neck. In the postero-superior part its anterior border becomes thick before it inserts into the anterior surface of the mastoid process while the posterior border becomes thin and aponeurotic before attaching to the lateral surface of the mastoid process and lateral half of the superior nuchal line [5].

The width of the muscle could be up to 4-5 cm in muscular men. It is supplied by three sternocleidomastoid arteries. Out of which upper two arise from the occipital artery and the lower one arises from the superior thyroid artery. The carotid sheath with its contents is overlapped by sternocleidomastoid muscle in most of its extent, however in literature it is described as a content of anterior triangle. This indistinct demarcation thus causes dilemma in understanding the applied anatomy of this region. The clinician, the radiologist and surgeons have to be cognizant of the vital structures located deep to sternocleidomastoid muscle. Surgical excision of any swelling along its length such as branchial cyst or enlarged lymph nodes needs precise understanding of this region as the structures

injured and surgical approach varies in different zones. Trauma surgeons divide the neck into three zones (zone 1, zone 2 and zone 3) extending from skull base to the sternal notch based on the urgency of exploration. The triangle based description of neck anatomy is not inclusive of this important region of the neck, "The sternocleidomastoid region". This review thus highlights the deficiency in teaching of head and neck anatomy.

## Conclusion

- We should teach the anatomy of neck as consisting of two triangles separated by a rhomboid. The rhomboid is the "sternocleidomastoid region".
- The anatomy of sternocleidomastoid region is of great significance to the clinician because correct diagnosis of neck swellings requires thorough knowledge of structures located in this region.
- A radiologist evaluating the neck during ultrasound, CT scan or MRI again requires understanding of the above structures.
- Surgeons operating upon lateral neck swelling have to be familiar with the sternocleidomastoid region.
- Operative procedure of neck dissection for malignancies requires retraction of the sternocleidomastoid in order to dissect and remove all the lymph nodes of the jugular chain.
- Sternocleidomastoid region, an area up to 5cm in width deserves a special mention in the anatomy of the neck.

## Acknowledgement

We acknowledge illustrators, Gauranjali Sharma and Vipul Gupta, at virtual teaching medicine, All India Institute of Medical Sciences, New Delhi for their contribution in preparing illustrations.

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DOI: [10.19080/APBIJ.2017.03.555607](https://doi.org/10.19080/APBIJ.2017.03.555607)

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